REMARKS/ARGUMENTS

A total of 41 claims remain in the present application. The foregoing amendments are presented in response to the Office Action mailed September 8, 2003, wherefore reconsideration of this application is requested.

By way of the above-noted amendments, original independent claims 1, 19 and 31 have been amended to more clearly define features of the present invention. Dependent claims 2-5, 14, 20, 22, 25 and 28 have been amended to reflect the revisions effected in claims 1 and 19, and to more clearly define features of the present invention. No disclaimer of subject matter is implied by these revisions, which are presented for clarity only. The specification has been amended at page 1 to properly identify related applications. Further revisions have been effected in pages 2, 5, 7, 14, 16, 17, 22, 23, 29, 34 and 35 of the specification to correct typographical errors identified therein. Finally, figures 1, 3, 4 and 5 are proposed to be amended in order to correct inconsistencies identified therein.

In preparing the above-noted amendments, careful attention was paid to ensure that no new subject matter has been introduced.

Referring now to the text of the Office Action:

a) The Examiner has objected to the Information Disclosure Statement filed with the present application, for failing to identify United States Patent No. 5,710,650.

b) The drawings have been objected to under 37 CFR 1.84(p)(5);

c) the Abstract has been objected to as exceeding 150 words;

d) the disclosure has been objected to in view of typographical errors identified therein;

e) claim 28 stands rejected under 35 USC § 112 as being indefinite;

f) claims 1, 2, 5, 19-24, 28, 31-33, 38 and 40 stand rejected under 35 U.S.C. § 102(b), as being anticipated by United States Patent No. 5,461,622 (Bleickardt et al.);

g) claims 3, 4, 39 and 41 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,461,622 (Bleickardt et al.);

h) claims 6, 7, 13, 34 and 37 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,461,622 (Bleickardt et al.) in view of United States Patent No. 5,537,405 (Yoshifuji);

i) claims 8 and 9 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,461,622 (Bleickardt et al.) in view of United States Patent No. 5,537,405 (Yoshifuji), and further in view of United States Patent No. 6,094,440 (Sugawara et al.);

j) claims 14-18 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,461,622 (Bleickardt et al.) in view of United States Patent No. 5,537,405 (Yoshifuji), and further in view of United States Patent No. 5,257,261 (Parruck et al.);

k) claims 35 and 36 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,461,622 (Bleickardt et al.) in view of United States Patent No. 5,257,261 (Parruck et al.); and

l) claims 10-12, 25-27, and 29-30 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As an initial matter, applicant appreciates the Examiner's indication of allowable subject matter in claims 10-12, 25-27, and 29-30. With respect to the other claims, the Examiner's rejections are believed to be traversed by the above-noted claim amendments, and further in view of the following comments.

Objection to the Information Disclosure Statement.

The Examiner has objected that the originally filed Information Disclosure Statement failed to identify United States Patent No. 5,710,650. Accordingly, a second Information Disclosure Statement identifying United States Patent No. 5,710,650 is being separately submitted concurrently herewith, along with the appropriate fees for late submission of prior art. Consideration of this reference is respectfully requested.

The Examiner has also requested copies of the related applications identified on page 1 of the specification. However, Applicant respectfully notes that they are not aware of any requirement under the CFR that the applicant provide paper-copies of related applications, all of which are on file with the US Patent and Trademark Office. Clarification of the Examiner's request is courteously solicited.

Objection to the abstract, specification and drawings.

It is believed that the Examiner's objection to the length of the abstract is traversed by the above-noted amendments.

Rejections under 35 U.S.C. § 112, second paragraph

It is believed that the Examiner's rejections of claim 28 under 35 U.S.C. § 112, second paragraph are fully traversed by the above-noted amendments in claim 28.

Rejections under 35 U.S.C. § 102(b) and 35 USC § 103(a)

In paragraph 15 of the Examiners detailed action, the Examiner asserts (in part), that "Bleickart discloses a method of and nodes for transporting a concatenated input signal

(super-rate signal) across a network using signals transmitted over a hyper-concatenated connection ...". Applicant respectfully submits that this interpretation is not supported by the Bleickart et al reference.

United States Patent No. 5,461,622 (Bleickardt et al.) teaches a system for transporting a super-rate SONET signal across a network by inverse-multiplexing the super-rate SONET signal into a plurality of lower-rate SONET signals. Thus, in the example embodiment described by Bleickardt et al., an STS-3c signal is inverse multiplexe4d into a set of three parallel STS-1 signals. Presumably, this method could be scaled, so that an STS-12c signal could be similarly inverse multiplexed into a set of three STS-4 signals, or a set of four STS-3 signals. In any event, as described by Bleickardt et al. this functionality permits a super-rate SONET signal to be inverse multiplexed into lower level (STS-3) SONET signals, which can then be transmitted through parallel channels of an optical communications network. At a receiving node, the inbound STS-1 signals can then be recombined to recover the original STS-3 signal. As is well known in the art, and described by Bleickardt et al., this technique enables super-rate SONET signaling to be transported across lower-speed legacy network infrastructure.

As noted in the background to the present invention, inverse multiplexing of higher rate signaling for transport over lower-rate infrastructure is well known in the art, and, in fact predates Bleickardt et al. However, all of these prior art techniques require a significant amount of signal processing, and are severely limited in the range of different concatenation schemes that can be accommodated. The system of Bleickardt et al. suffers both of these limitations. In particular, Bleickardt et al. require that the super-rate SONET signal be demultiplexed to separate the data from the frame. The data is then buffered and split into separate pieces, which can then be individually mapped to the respective SPE of each of the lower rate signals. This approach suffers the disadvantage that it cannot accommodate a range of different concatenation schemes. In particular, the system of

Bleickardt et al. will only inverse multiplex an STS-3 signal into three STS-1 signals. Although the teaching of Bleickardt et al. may be used to guide the design of systems for performing different concatenations, it remains that each such different concatenation requires the design and construction of a respective different system (ASIC). Thus, for example, if it is desired to inverse multiplex an STS-12 signal into three STS-4 signals, or the same STS-12 signal into four STS-3 signals, then respective different systems (ASICs) designed for each scheme must be provided. Thus it will be seen that United States Patent No. 5,461,622 (Bleickardt et al.) is representative of precisely the prior art over which the present invention is defined.

The present invention is directed to solving the problem of transporting hyper-concatenated (as opposed to merely inverse multiplexed) data streams. As described at page 5 lines 6-22:

> ... In this system, data signals (which may comprise an arbitrary mixture of concatenated and non-concatenated signal traffic) are inverse-multiplexed and transported hop-by-hop through a hyper-concatenated connection distributed across multiple parallel hyper-concatenated channels....
>
> In this context, the terms "hyper-concatenation" (used as a noun) and "hyper-concatenated connection", refer to a multi-channel communications path that supports an arbitrary mixture of concatenated and unconcatenated signal traffic and a maximum connection size equal to the total bandwidth capacity of all of its member channels. (Underlining added)

Furthermore, as described at page 22 lines 12-20:

> As shown in Fig. 3, the signal processor 32 receives a serial concatenated data stream containing an arbitrary mix of low bandwidth signals and high bandwidth concatenated signals. The serial data stream may be received through a single input port 31, as shown, or may be distributed across two or more ports. The signal processor 32 is designed to process the serial data stream to split the respective signals across the multiple channels of the hyper-concatenated connection 24, in accordance with the channel assignments associated with the hyper-concatenated connection 24.. (Underlining added)

Thus it will be readily apparent that the "hyper-concatenated data streams" required by the present claims are not merely lower rate signals produced by inverse multiplexing a specific bigher rate signal, as in Bleickardt et al. Instead, the hyper-concatenated data streams are the results of inverse multiplexing "a serial concatenated data stream containing an arbitrary mix of low bandwidth signals and high bandwidth concatenated signals ". It therefore follows that each hyper-concatenated data stream (or, equivalently, each derived signal) must inherently exhibit an arbitrary concatenation, which may change frequently, and which will generally not be known in advance. In fact, it would likely be fair to state that within a hyperconcatenated data stream, the signal concatenation is undefined.

In stark contrast to the arbitrary (and undefined) concatenation exhibited by hyperconcatenated data streams, the concatenation of the lower rate signals of Bleickardt et al is strictly defined by the desired inverse-multiplexing operation. For example, a system in accordance with Bleickardt et al designed to inverse multiplex an STS-3c signal into three STS-1 signals, must receive an STS-3c signal, and can only output three STS-1 signals. If three un-concatenated STS-1 signals were received instead of the expected STS-3c, the system of Bleickardt et al will fail. Thus it will be seen that the prior art systems (as represented by Bleickardt et al) do not attempt to process hyper-concatenated data streams, and in fact cannot do so. Nor can they be modified to be operative for aligning hyper-concatenated data streams.

In light of the foregoing, it is submitted that Bleickardt et al does not teach or suggest a method of and nodes for transporting a concatenated input signal (super-rate signal) across a network using signals transmitted over a hyper-concatenated connection ..." as alleged by the Examiner.

The remaining references do not supply the missing teaching.

In light of the foregoing, it is respectfully submitted that the presently claimed invention is clearly distinguishable over the teaching of the cited references, taken alone or in any combination. Thus it is believed that the present application is in condition for allowance, and early action in that respect is courteously solicited.

If any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this response, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,

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Date: December 5, 2003

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Duplicate of Amdt 6

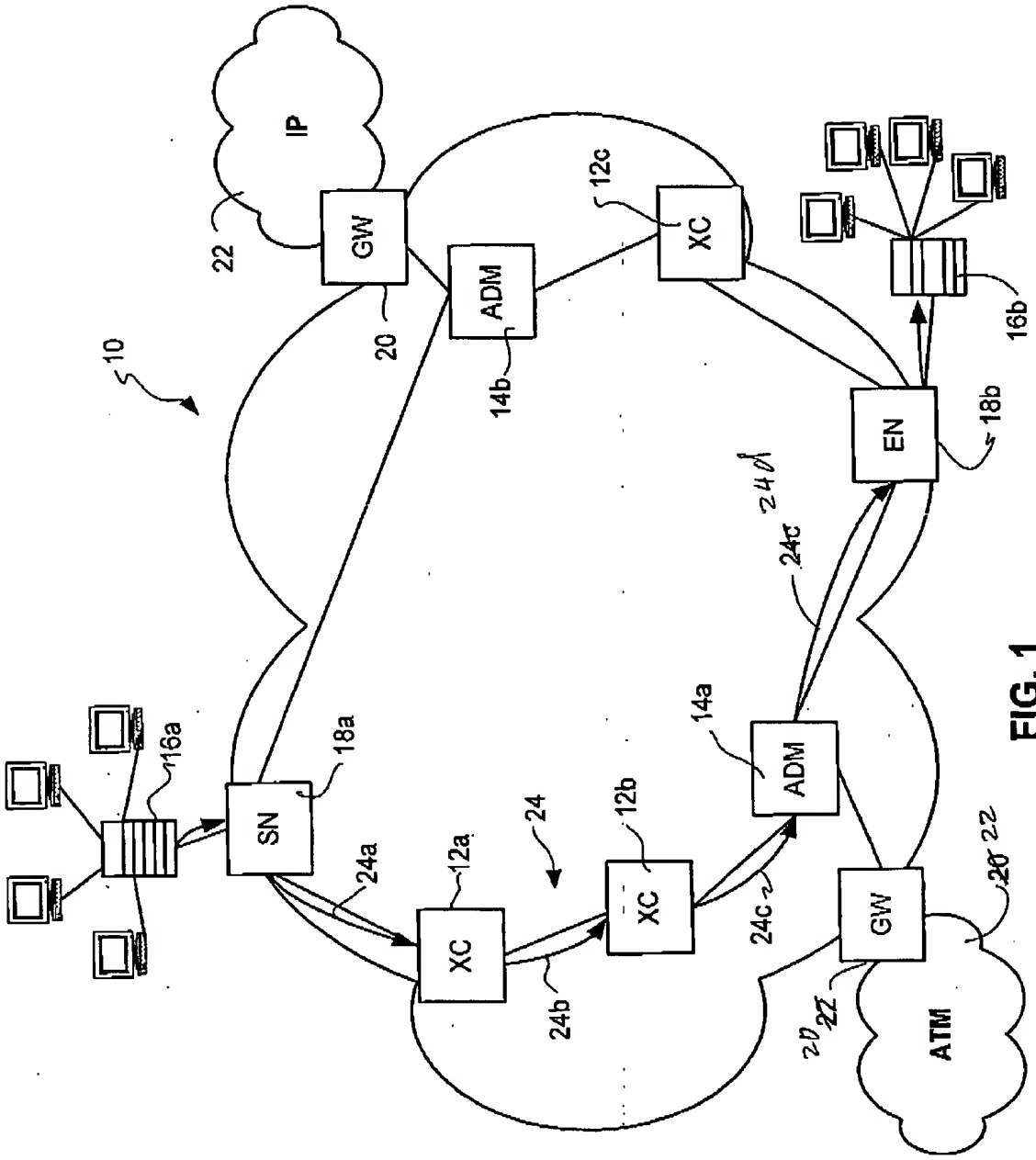


FIG. 1

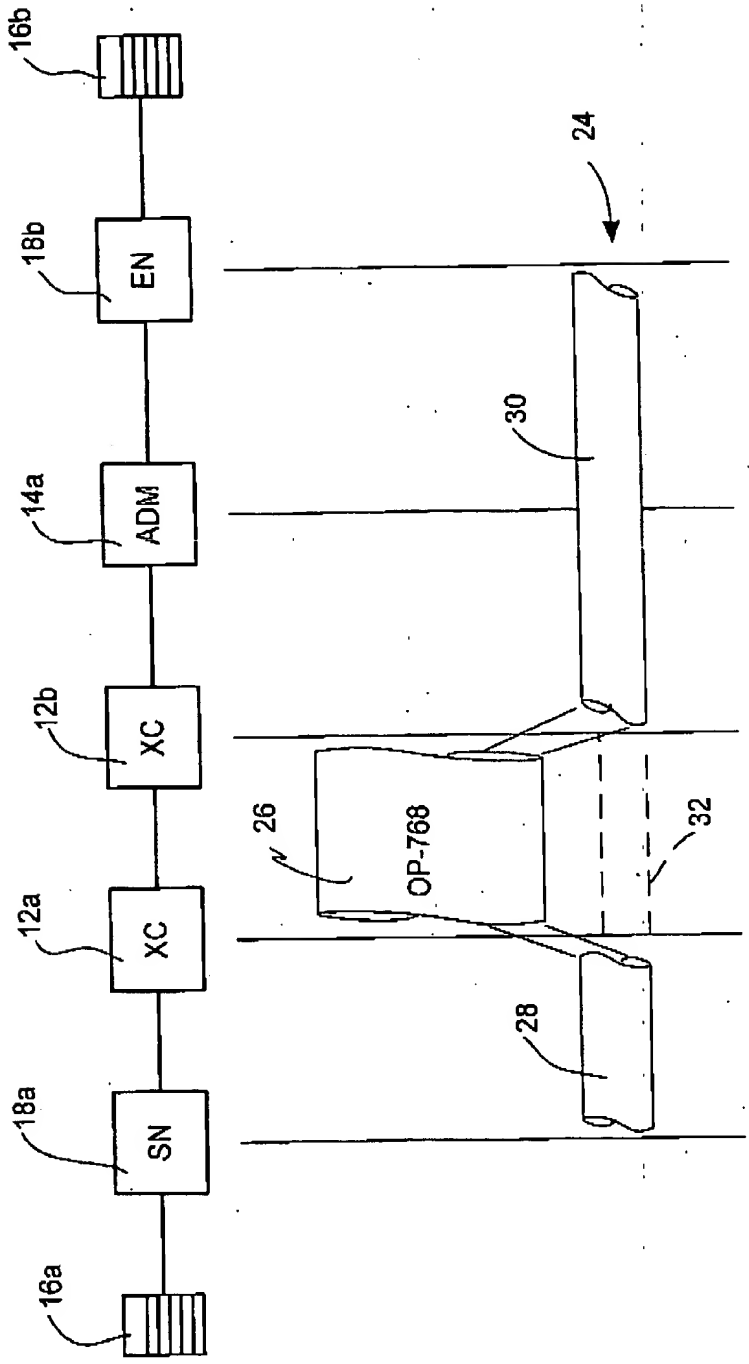
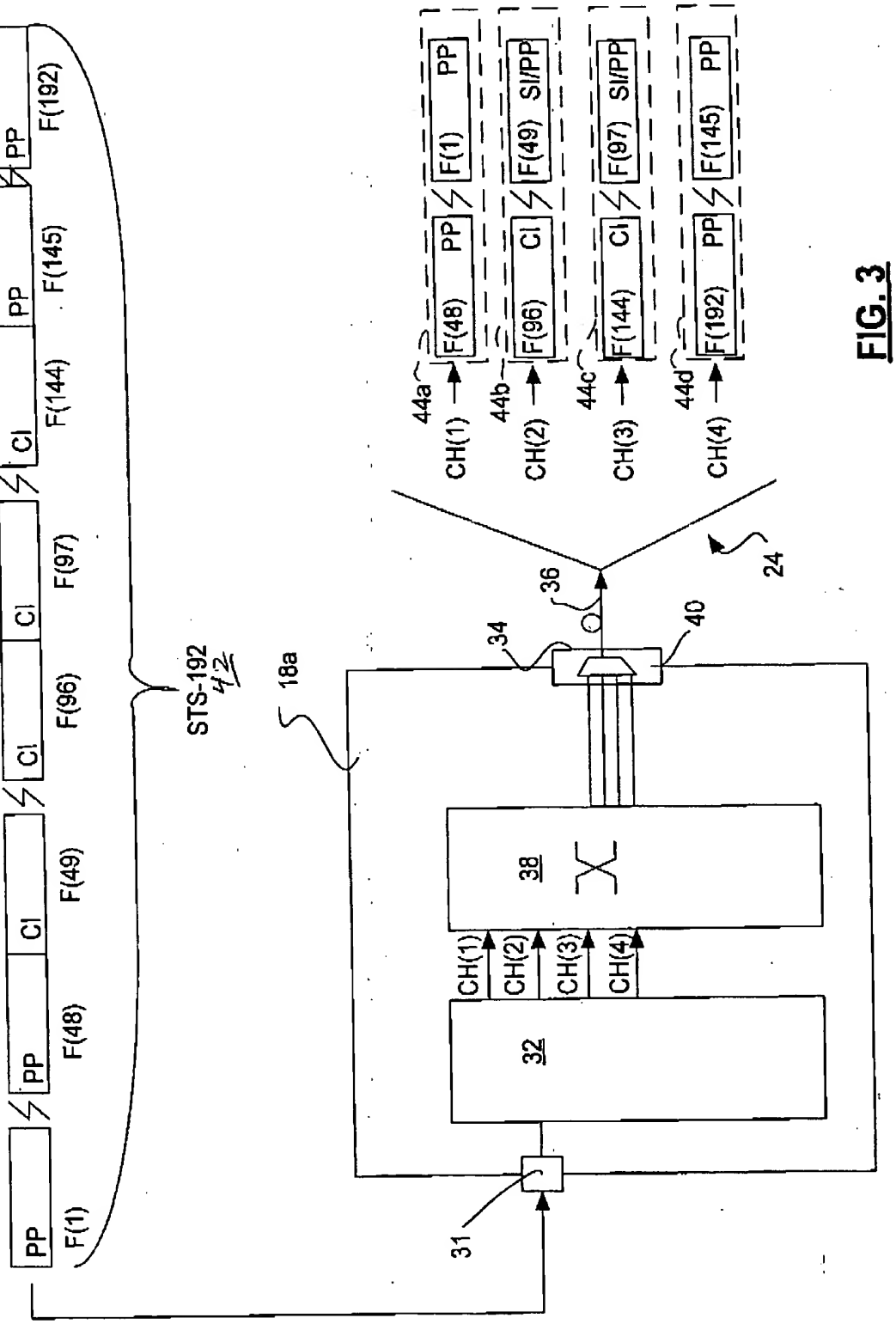


FIG. 2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PP
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F(48)
CI
CI
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CI
CI
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CI
CI
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PP
F(144)
PP
F(145)
PP
F(192)
STS-192
42
18a
34
36
40
24
44a
44b
44c
44d
CH(1)
CH(2)
CH(3)
CH(4)
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38
32
31

FIG. 3

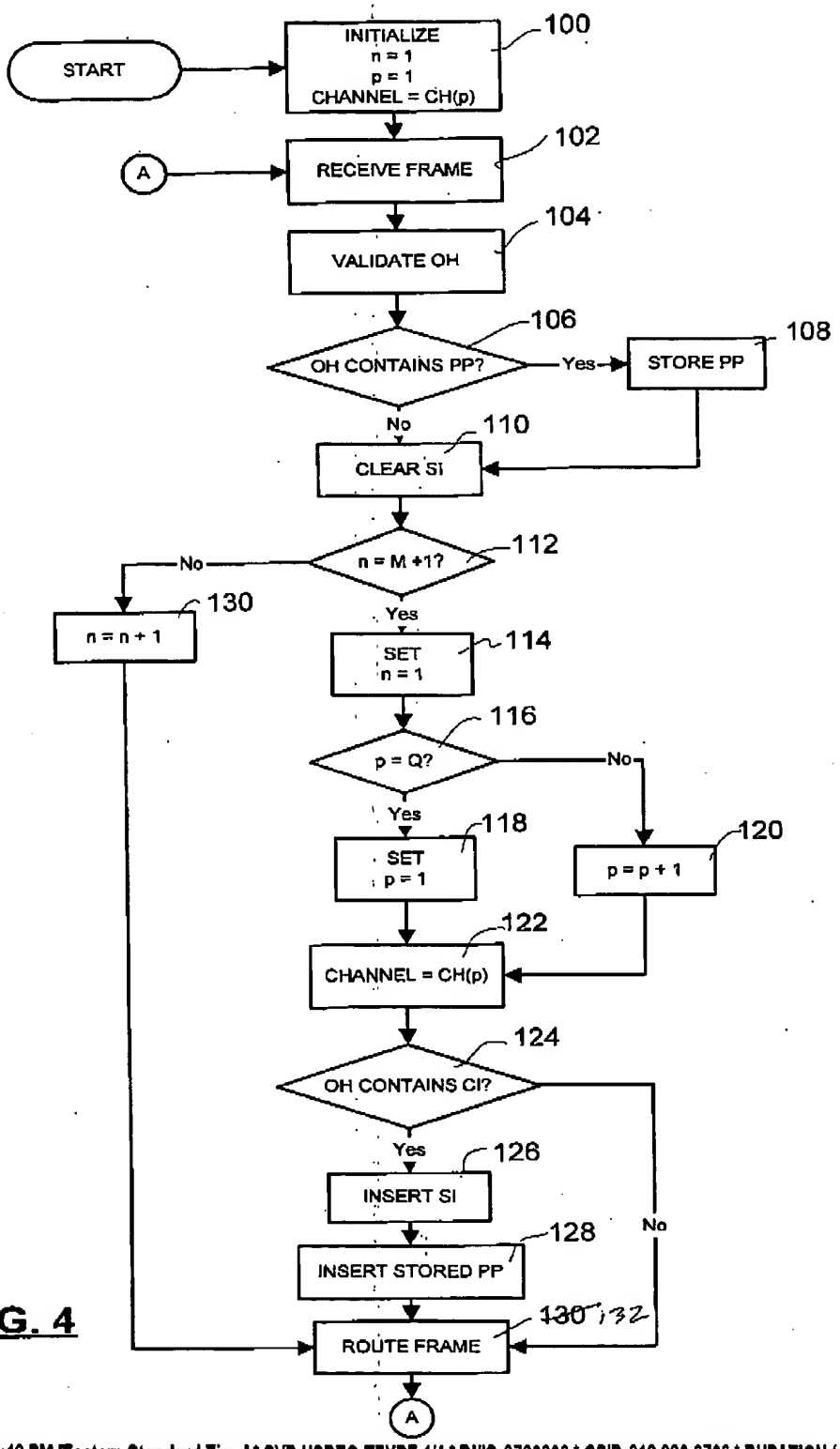
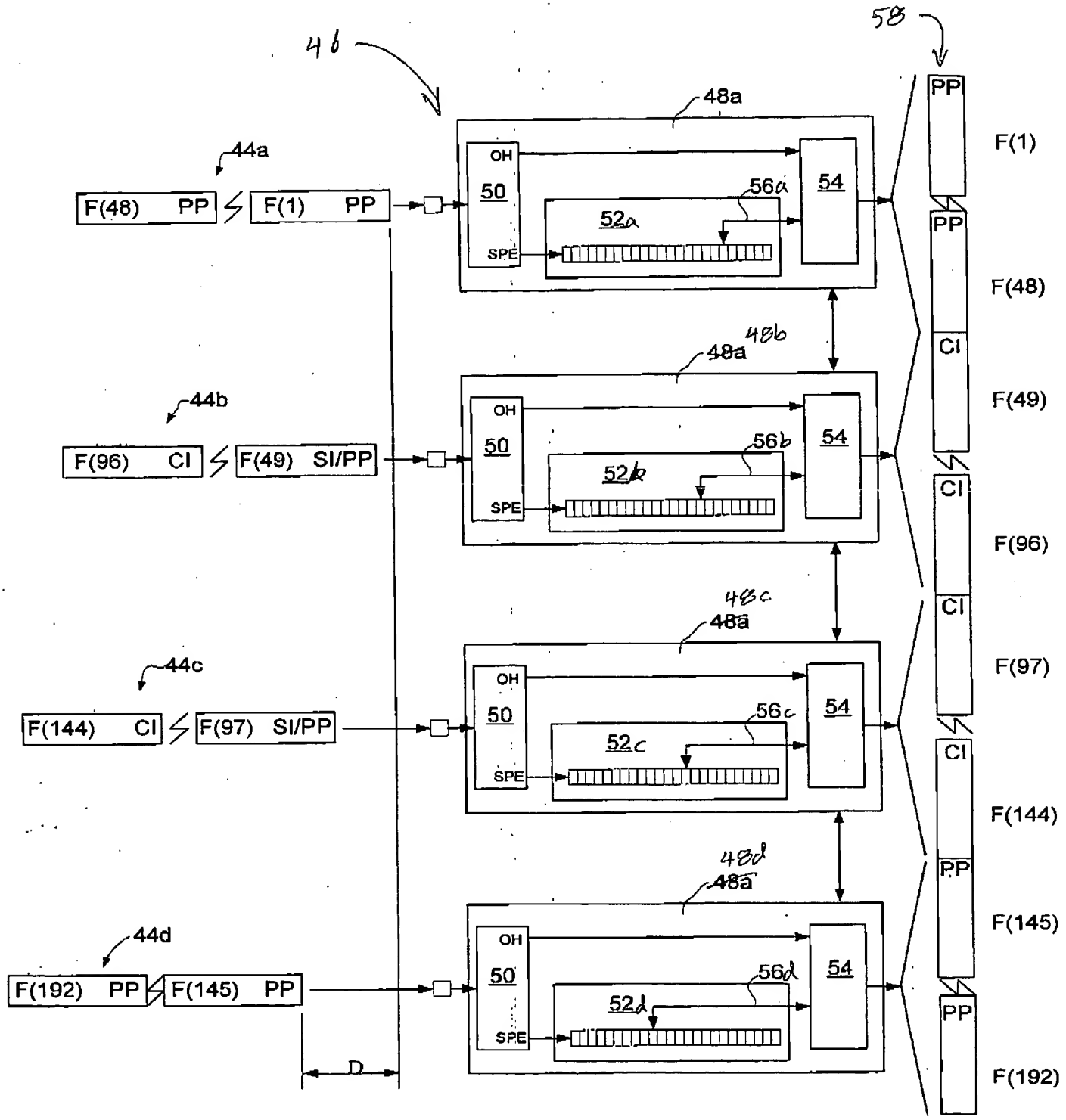

START
INITIALIZE
n = 1
p = 1
CHANNEL = CH(p)
100
A
RECEIVE FRAME
102
VALIDATE OH
104
OH CONTAINS PP?
106
Yes
STORE PP
108
No
CLEAR SI
110
n = M +1?
112
No
n = n + 1
130
Yes
SET
n = 1
114
p = Q?
116
No
Yes
SET
p = 1
118
p = p + 1
120
CHANNEL = CH(p)
122
OH CONTAINS CI?
124
Yes
INSERT SI
126
No
INSERT STORED PP
128
ROUTE FRAME
130 132
A

FIG. 4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D

FIG. 5